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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/761,765	01/21/2004	Christopher Charles Williams	N1083	2873

7590 03/11/2005
Norman Friedland
Suite 400
11300 US Highway One
North Palm Beach, FL 33408

EXAMINER

BAREFORD, KATHERINE A

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 03/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/761,765

Applicant(s)

WILLIAMS, CHRISTOPHER
CHARLES

Examiner

Katherine A. Bareford

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: (1) at page 4, line 1, "peeing" should apparently be "peening". (2) At page 11, line 6, after "form a" a ")" is needed. (3) at page 16, line 2, the units of residual stress "5n to 20n" are different than that used in the claims (N rather than n).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-8 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In claim 1, part i) and claim 4, part g, the airfoil is to be cold worked to impart a "residual compressive stress in the range of 5N to 20N". This is also the residual compressive stress described in the specification (at page 16, lines 1-2, although "5n to 20n" is used). However, stress is measured in units of force (such as Newton, N) per unit area (such as meters squared – m²). It is unclear from a reading of the specification and claims as originally filed as to what compressive stress is actually used given the use of N and n, neither of which provides stress units. One of

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ordinary skill in the art would not be able to make and/or use the invention without performing undue experimentation to determine what stress is actually acceptable. If applicant is actually referring to the spray intensity of the ceramic shot (as described at page 12, lines 7-18), it should be noted that the claim is not limited to what is described in the specification.

The other dependent claims do not cure the defects of the claims from which they depend.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, line 4, "the surface" lacks antecedent basis.

Claim 1, line 4, "airfoil and component" should apparently be "airfoil or component" unless applicant means to require the treatment of multiple parts at the same time.

Claim 1, line 8, "with a TiN of the parts in step ii)", should apparently be "of the parts cleansed in step ii) with TiN" for clarity as to what actually occurs.

Claim 1, last 2 lines, "to a thickness of generally between 3 microns to 30 microns" is unclear as to whether each layer is 3 to 30 microns thick or the total thickness of the layers is 3 to 30 microns.

Claim 2, it is unclear as to whether applicant means that the coating material is TiN from claim 1, further including additional metal alloys as described or whether a different coating material of only the metal alloys listed is used. If a different coating material is used, the claim is not further limiting of claim 1.

Claim 2, lines 1-2, "can be taken essentially from", if applicant means to provide the Markush type consisting essentially of grouping, the claim wording should be "selected from the group consisting essentially of". The Examiner further notes that at lines 2-3, "that may have alloying elements such as aluminum, cobalt and nickel" does not provide any further limitation to the claim as the use of these materials is optional.

Claim 3, lines 1-2, "consists essentially of any of the . . .", if applicant means to provide the Markush type consisting essentially of grouping, the claim wording should be "is selected from the group consisting essentially of the . . .".

Claim 4, line 6, "from step 1)" should apparently be "from step a".

Claim 4, line 9, "indications used" should apparently be "indications of the used".

Claim 4, line 11, "penetrans" – does applicant mean "penetrants"?

Claim 4, line 11, "inspecting by fluorescent penetrans inspect used blades" should apparently be "inspecting by fluorescent penetrans the used blades".

Claim 4, line 13, "de-greasing used blades" should apparently be "de-greasing the used blades".

Claim 4, section i, "with a TiN of the parts in step ii)", should apparently be "of the parts cleansed in step h with TiN" for clarity as to what actually occurs. Also, "to a thickness of

generally between 3 microns to 30 microns” is unclear as to whether each layer is 3 to 30 microns thick or the total thickness of the layers is 3 to 30 microns.

WS Claim 6, line 3, what kind of intensity is meant by $10N_{\lambda}^?$

WS Claim 7, it is unclear as to whether applicant means that the coating material is TiN from claim 4_{λ} , further including additional metal alloys as described or whether a different coating material of only the metal alloys listed is used. If a different coating material is used, the claim is not further limiting of claim 4_{λ} .

WS Claim 7, lines 1-2, “can be taken essentially from”, if applicant means to provide the Markush type consisting essentially of grouping, the claim wording should be “selected from the group consisting essentially of”. The Examiner further notes that at lines 2-3, “that may have alloying elements such as aluminum, cobalt and nickel” does not provide any further limitation to the claim as the use of these materials is optional.

Claim 8, lines 1-2, “consists essentially of any of the . . .”, if applicant means to provide the Markush type consisting essentially of grouping, the claim wording should be “is selected from the group consisting essentially of the . . .”.

The other dependent claims do not cure the defects of the claims from which they depend.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta et al (US 4904528) in view of Cretella et al (US 4028787), Bergmann et al (US 5238546) and Paidassi et al (US 5702829).

Gupta teaches a method of protecting the gas turbine engine components, such as blades and vanes. Column 1, lines 5-20. The surface of the component is cold worked by shot peening to have a controlled residual surface compressive stress of 50 to 100 ksi. Column 5, line 55 through column 6, line 15 (given the confusion as to what amount of residual stress is desired, as discussed in the 35 USC 112, 1st paragraph rejection above, it is the Examiner's position that the range of stresses provided by Gupta would read on that claimed). After cold working, a coating of titanium nitride (TiN) is applied to the component. Column 1, line 60 through column 2, line 35. The coating is applied by a vapor deposition process that can be a cathodic arc deposition. Column 2, lines 5-30. The coating thickness can be 10 to 25 microns. Column 2, lines 20-25.

Claim 2, 7: the coating material can include chromium and vanadium. Column 2, lines 30-35.

Claim 3, 8: the cold working can be by shot peening. Column 6, lines 1-10.

Gupta teaches all the features of these claims except (1) the cleaning step ii, (2) the temperature of deposition, (3) the layers of different hardness, (4) the repair and all repairing steps (claim 4), (5) the inspection steps (claim 5) and (6) the peening step (claim 6).

However, Cretella teaches that it is desired to recover and repair used gas turbine engine components such as vanes. Column 1, lines 10-30. In the process the vanes are first cleaned and degreased. Column 4, lines 1-6 (steps 1 and 2). Then they are inspected. Column 4, lines 5-10 (see step 3). They are also inspected by fluorescent penetrants. Column 4, lines 5-10 and 49 (steps 4, 14). Cracks and other defects are repaired by welding and building up. Column 4, lines 10-25 (steps 7-9). The surface is cleaned and conditioned and a ^{shot}~~shot~~ peening operation can occur. Column 4, lines 25-30 (step 10). The blade is then coated. Column 4, lines 25-40 (step 11). The finished blade is inspected. Column 4, lines 45-55 (step 14 and 17). While Cretella does not provide all the treatment steps in the same order as in claim 4, the claim does not require the sequential provision of the steps.

Bergmann teaches a process for the cathodic arc deposition of TiN. Column 6, lines 30-65. The process can occur at a temperature such that the process temperature did not exceed 222 degrees C. Column 8, lines 30-60.

Paidassi teaches providing a protective coating on a component of a gas turbine, such as a blade. Column 1, lines 10-20. Paidassi teaches that the layers have different hardness and allow for erosion and cracking protection. Column 5, lines 15-40 and column 7, lines 10-15. The layers can be applied by a cathodic deposition. Column 5, lines 50-65. The total thickness of the layers can be 5-200 microns. Column 8, lines 10-20.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gupta to repair turbine blades and to perform cleaning between the shot peening and the coating as taught by Cretella in order to provide a desirable coated blade product, because Gupta teaches a desirable protective coating of TiN to be applied to turbine blades and Cretella teaches that it is desirable to repair and reuse turbine blades and to clean blades before coating treatments. It would further have been obvious to modify Gupta in view of Cretella to optimize the temperature of the deposition of the coating by routine experimentation, because Bergmann teaches that when using cathodic deposition to deposit TiN, it is known to use a temperature no higher than 222 degrees C. It would further have been obvious to modify Gupta in view of Cretella and Bergmann to provide the coating made up of layers of TiN of different hardness as suggested by Paidassi to provide a component protected under various conditions, because Gupta in view ^{of} Cretella and Bergmann teaches to protect a turbine component with TiN and Paidassi teaches that when protecting a turbine component, providing different layers of different hardness provides for optimum protection of the component. It would further have been obvious to modify Gupta in view of Cretella, Bergmann and Paidassi to use the inspection step of claim 5 and the peening of claim 6 with an expectation of having desirable inspection and peening, because Cretella teaches the desire to inspect turbine blades to be repaired using a fluorescent inspection and one of ordinary skill in the art would use a well-known method of testing as provided by the ASTM method of claim 5 in order to provide controlled testing and further because Gupta teaches the desire to shot peen to provide a controlled range of residual stress and one of ordinary

skill in the art would use a well-known method of peening as provided by the AMS method of claim 6 in order to provide controlled achievement of residual stress.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


KATHERINE BAREFORD
PRIMARY EXAMINER